CLAIMS

WHAT IS CLAIMED IS:

1. A charge control circuit, comprising:

a switch circuit having an input node configured to receive a reference voltage at a selected voltage level and configured to respond to a charge signal to pre-charge said input node with a pulse charge at said selected voltage level; and

wherein said switch circuit further includes a single switch configured to respond to an enable signal having a duration shorter than a mechanical time constant of a micro-electro mechanical device (MEM device) having a variable capacitor with first and second plates and wherein said single switch is coupled to said MEM device to apply said selected voltage level across first and second plates of a variable capacitor of said MEM device for said duration to thereby cause said pulse charge to accumulate on said variable capacitor.

2. The charge control circuit of claim 1, wherein said single switch comprises a transistor.

3. The charge control circuit of claim 1, wherein said single switch is a first switch, and said switch circuit further comprises a second switch coupled to said input node and said first switch such that said first switch is between said MEM device and said second switch and wherein said second switch is configured to close to provide said reference voltage to said input node in response to said charge enable signal to charge said input node with said pulse charge.

4. The charge control circuit of claim 3, wherein said switch circuit further comprises a third switch such that said first, second and third switches are on separate branches connecting to said input node .

5. The charge control circuit of claim 4, wherein said first switch is configured to close in response to an enable signal and said third switch is configured to close in response to a clear signal.

6. The charge control circuit of claim 5, wherein closing said first switch in response to said enable signal after charging said input node applies said selected voltage level across said first and second plates.

7. The charge control circuit of claim 4, wherein opening said second switch and closing said first and third switches provides a path between said first plate and a clear voltage for clearing charge from said first plate.

8. The charge control circuit of claim 4, wherein said first, second, and third switches comprise p-channel metal oxide semiconductor devices.

9. The charge control circuit of claim 4, wherein said first, second and third switches comprise n-channel metal oxide semiconductor devices.

10. The charge control circuit of claim 1, further comprising a variable power supply coupled to said input node and configured to provide said reference voltage at said selected voltage level.

11. The change control circuit of claim 10, further comprising a controller configured to provide said charge signal, said enable signal, and a clear signal to control said selected voltage level provided by said variable power supply.

12. A micro-electromechanical cell, comprising:

a micro-electromechanical (MEM) device having a variable capacitor formed by a first conductive plate and a second conductive plate separated by a variable gap distance; and

a switch circuit having an input node configured to receive a reference voltage at a selected voltage level and configured to respond to a charge signal

to pre-charge said input node with a pulse charge at said selected voltage level; and

wherein said switch circuit further includes only a first switch coupled to said variable capacitor configured to respond to an enable signal having a duration shorter than a mechanical time constant of a MEM device and coupled to said MEM device to apply said selected voltage level across first and second plates for said duration to thereby cause said pulse charge to accumulate on said variable capacitor.

13. The charge control circuit of claim 12, wherein said switch circuit comprises a second switch coupled to said first switch and configured to close to provide said reference voltage to said input node in response to said charge signal to charge said input node with said pulse charge.

14. The charge control circuit of claim 13, further comprising a third switch coupled to said input node such that said first, second and third switches are on separate branches connecting to said input node.

15. The charge control circuit of claim 14, wherein said first switch is configured to close in response to said enable signal and said third switch is configured to close in response to a clear signal.

16. The charge control circuit of claim 14, wherein said first, second, and third switches comprise p-channel metal oxide semiconductor devices.

17. The charge control circuit of claim 14, wherein said first, second and third switches comprise n-channel metal oxide semiconductor devices.

18. A micro-electromechanical system, comprising:

an M-row by N-column array of a micro-electromechanical cells, wherein each cell includes a MEM device having a variable capacitor formed by a first

conductive plate and a second conductive plate separated by a variable gap distance; and

a switch circuit having an input node configured to receive a reference voltage at a selected voltage level and configured to respond to a charge signal to pre-charge said input node with a pulse charge at said selected voltage level and wherein said switch circuit further comprises a single switch coupled to said variable capacitor and configured to respond to a enable signal having a duration shorter than a mechanical time constant of a MEM device and coupled to said MEM device to apply said selected voltage level across first and second plates of a variable capacitor of said MEM device for said duration to thereby cause said pulse charge to accumulate on said variable capacitor.

19. The system of claim 18, wherein each of said M rows receives a separate enable signal and all of N switch circuits of a given row receive a same enable signal.

20. The system of claim 18, wherein each of said N columns receives a separate reference voltage and all M switch circuits of a given column receive a same reference voltage, wherein each separate reference voltage can have a different selected voltage level.

21. The system of claim 18, wherein each switch circuit is further configured to discharge a stored charge on the variable capacitor in response to said enable signal and a clear signal.

22. A charge control circuit, comprising:

means for accumulating a charge;

means for transferring said charge to a variable capacitor;

means for reducing the capacitance of said means for transferring said charge; and

means for removing said charge from said variable capacitor.

23. A method of controlling a micro-electromechanical device having a variable capacitor, comprising:

applying a voltage at a preselected voltage level to charge an input node;

providing an enable signal to a first switch to close said first switch for a duration less than the mechanical time constant of said micro-electromechanical device; and

applying said charge to said variable capacitor wherein said charge corresponds to a gap distance between first and second conductive plates of said variable capacitor and wherein said first switch is the only switch directly coupled to said variable capacitor.

24. The method of claim 23, wherein applying said voltage comprises providing a charge enable signal to said first switch to close said first switch to an input voltage.

25. The method of claim 24, further comprising providing an enable signal and a clear signal to close said first switch and a third switch respectively in order to clear a charge from said variable capacitor.

26. A charge control circuit, comprising:

a switch circuit having an input node configured to receive a reference current at a selected current level and configured to respond to a charge signal to pre-charge said input node with a pulse current at said selected current level; and

wherein said switch circuit further comprises a first switch configured to respond to an enable signal having a duration shorter than a mechanical time constant of a micro-electromechanical device (MEM device) and coupled to said MEM device to apply said selected current level across first and second plates of a variable capacitor of said MEM device for said duration to thereby cause said pulse current to accumulate on said variable capacitor wherein the first switch is the only connected to said capacitor.

27. The charge control circuit of claim 26, wherein said variable gap distance is a function of the magnitude of said stored charge.

28. The charge control circuit of claim 26, wherein said switch circuit further comprises a second switch coupled to said MEM device and configured to close to provide said reference current to said input node in response to said charge signal to charge said input node with said pulse current.

29. The charge control circuit of claim 28, further comprising a third switch coupled to said input node and a clear voltage.

30. The charge control circuit of claim 29, wherein said first switch is configured to close in response to said enable signal and said third switch is configured to close in response to a clear signal.

31. The charge control circuit of claim 30, wherein closing said second switch in response to said enable signal after charging said input node applies said selected current level across said first and second plates.

32. The charge control circuit of claim 29, wherein opening said first switch and closing said second and third switches provides a path between said first plate and said clear voltage for clearing charge from said first plate.

33. The charge control circuit of claim 29, wherein said first, second, and third switches comprise p-channel metal oxide semiconductor devices.

34. The charge control circuit of claim 29, wherein said first, second and third switches comprise n-channel metal oxide semiconductor devices.